LEVEL III

TRASANA

TECHNICAL REPORT NO. 3-78

FLIGHT PROFILE PERFORMANCE HANDBOOK

VOLUME VI—OH-58C (KIOWA)

NOVEMBER 1978

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DISTRIBUTION UNLIMITED

DEPARTMENT OF THE ARMY
US ARMY TRADOC SYSTEMS ANALYSIS ACTIVITY
WHITE SANDS MISSILE RANGE
NEW MEXICO 88002

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9 TECHNICAL REPORT, NO. 3-78

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FLIGHT PROFILE PERFORMANCE HANDBOOK.

VOLUME VI. OH-58C (KIOWA).

PREPARED BY

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Alan J. Wolfe

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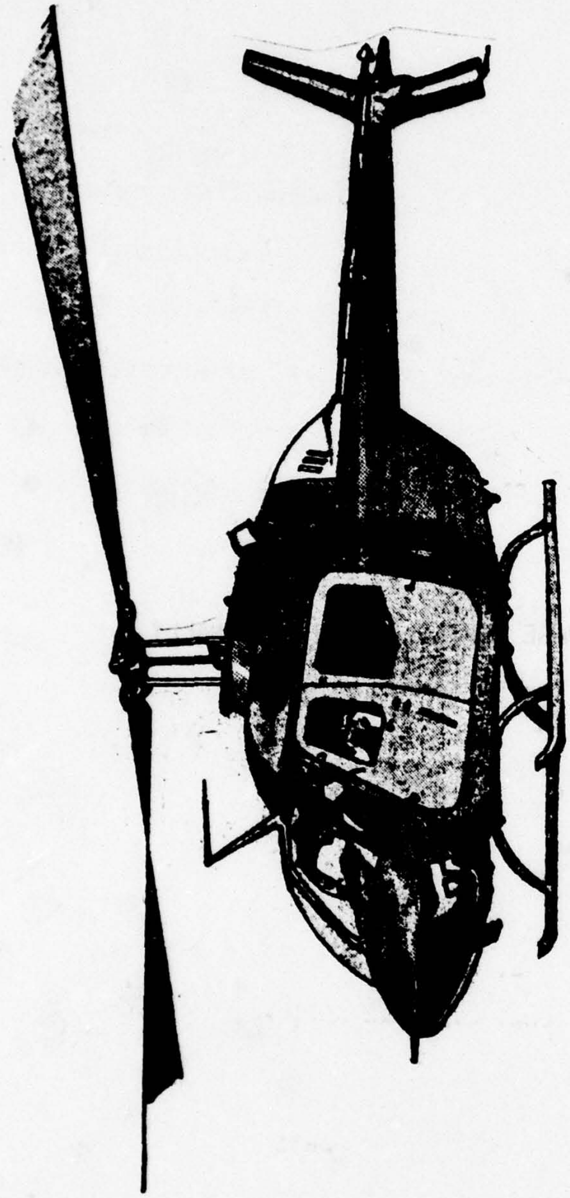


KIOWA (OH-58)

CHAPTER 1

INTRODUCTION

1. PURPOSE

The purpose for preparing this handbook series is fourfold: (a) to validate KIOWA performance data quickly; (b) to reduce the manpower and time to prepare accurate flight profiles; (c) to standardize performance data so that the analysis community can benefit from a single reference in conducting studies; and (d) to provide a handbook that can be used for training in the mission profile planning area.

2. BACKGROUND

The KIOWA performance data contained in this Flight Profile Performance Handbook (FPPH) series was originally acquired as a data base for the Aircraft Mission Processing Simulation (AMPS) model. AMPS is a computer program developed by the Aviation Systems Analysis Branch of the US Army TRADOC Systems Analysis Activity (TRASANA) to support Cost and Operational Effectiveness Analyses (COEAs). AMPS generates detailed flight profiles for a wide variety of helicopter missions. The data was provided TRASANA by the Army Aviation Research and Development Command (AVRADCOM) and was the most accurate data available to AVRADCOM at the time of handbook publication. In structuring the data base for AMPS it was noted that the data, when properly organized, could provide a method of doing quick and simple flight profile simulations. This volume presents the KIOWA data and explains how it can be used.

3. OBJECTIVES OF THE HANDBOOK

a. <u>Data Validation</u>. This volume of the handbook contains tables with the precise performance data and format required to develop flight profiles for computer simulations. Using the handbooks as a reference, the individual project manager (PM) will be able to quickly validate or update as required all associated data contained in the different tables. If this procedure is followed by the various PMs, support of Helicopter COEAs and other analyses can be efficiently implemented.

b. <u>Flight Profile Development</u>. Much of the manpower and time spent in preparing flight profiles for supporting aircraft COEAs is dedicated to look-up, correlation and validation of performance data. Once the procedure contained in this handbook is implemented, flight profiles can be easily prepared. What normally took one man 4 to 5 days to prepare can now be prepared in 3 to 4 hours.

c. Standardization of Performance Data. Each of the PMs has been contacted by AVRADCOM to validate the performance data contained in each handbook in this series. Once each handbook is published, the data contained will be kept current as of the publication date. Since the requests for current information are constantly being forwarded to the PMs by analysis groups, this handbook can be a reference and assure a commonality in studies within the community.

d. Training for Planning Missions and Flight Profiles. For training purposes each handbook can stand alone. It is only a matter of following the example provided and applying the proper data to fit the flight profile desired. Although the example shown is simplistic, the methodology may be expanded to apply to any flight profile no matter how complex.

4. OTHER VOLUMES

This handbook is one of a series that covers the helicopters in the US Army inventory. The complete set of handbooks and their subjects are:

Volume I - FPPH Description

Volume II - UH-60A (BLACKHAWK)

Volume III - AH-1G (COBRA)

Volume IV - AH-1S (COBRA)

Volume V - YAH-64 (Advanced Attack Helicopter [AAH])

Volume VI - OH-58C (KIOWA)

Volume VII - CH-47 (CHINOOK)

Volume VIII - CH-54 (TARHE)

Volume IX - UH-1H (HUEY)

5. GENERAL HANDBOOK DESCRIPTION

a. Performance Data. The data contained in these volumes is KIOWA performance data compiled from the results of actual experiments. It is not engineering data and is not intended to serve as a base for future helicopter construction or acquisition. The more mature the helicopter becomes, the less likely there will be a change in the basic performance data.

b. Handbook Organization. This volume is one of a series of volumes as identified in paragraph 4 above. Volume I is a description of the methodology used to develop the tables for each of the other volumes. This volume and all other volumes except Volume I provides a simplified flight profile example in Chapter 2. Chapter 3 provides an explanation of each of the five types of data tables contained in the handbook. The five types of tables deal with: (1) Basic Fuel Flow Data, (2) Delta Fuel Flow for Drag Data, (3) Ground Idle Fuel Flow Data, (4) Gross Weight Limits Data and, (5) Velocity Limits Data. Chapter 4 contains the actual tables to be used for developing flight profiles.

CHAPTER 2

FLIGHT PROFILE EXAMPLE

1. GENERAL

This chapter provides an example of how to develop a flight profile, albeit simple, that can be extended to cover any number of stops, loads and distances all depending on helicopter capability and fuel available.

2. DISCUSSION

a. The main question this example of a flight profile will answer is, "Do I have enough fuel to fly the proposed mission?"

b. Suppose a pilot is to fly a simple scout mission in an OH-58C helicopter that calls for flying (as shown in illustration 2-1) from point A (the air base), to point B (the holding area) to point C (the combat area) and return to A.

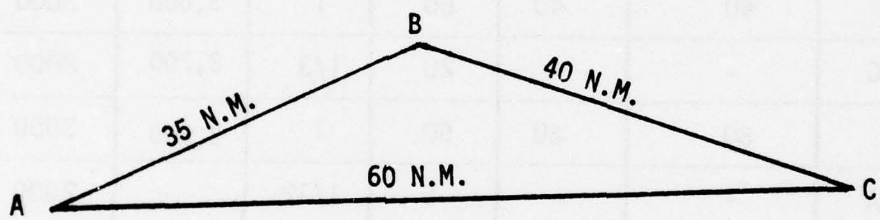


Illustration 2-1

c. The other information given is airspeed (AS) from A to B which is to be 70 knots (kts), from B to C 40 kts, and from C to A 60 kts. The OH-58C helicopter is to be flown at an ambient temperature of 15°C. The leg from A to B will be flown at 4,000 ft,* while legs B to C and C to A will be at 3,000 ft. The ground elevations at A, B and C are all 2,000 ft. The mission plan also shows 10 minutes idle at A before takeoff, 15 minutes idle at B, 20 minutes Hover in Ground Effect (HIGE) at C and 5 minutes idle on returning to A for shut-down. The OH-58C will take off with a gross weight (GW) of 3,000 lbs at A and continue to carry this weight until arriving at C. At C his GW will be 2,700 lbs and on the return to A, the GW will be 2,600 lbs.

***All altitudes are in reference to sea level.**

d. The flight plan is prepared by drawing up a table similar to Table 2-1 below. By filling in the blanks under fuel, it can be determined if the total is too large for the helicopter.

TABLE 2-1

Helicopter: OH-58C

Temperature: 15°C

LEG	DISTANCE N.M.	AS KTS	TIME MIN	TIME HR	GW LBS	ALT FT	FUEL LBS
Idle @ A	-	-	10	1/6	-	2000	
A - B	35	70	30	1/2	3,000	4000	
Idle @ B	-	-	15	1/4	-	2000	
B - C	40	40	60	1	3,000	3000	
HIGE @ C	-	-	20	1/3	2,700	2000	
C - A	60	60	60	1	2,600	3000	
Idle @ A	-	-	5	1/12	-	2000	
						Total	

e. First fill in Idle @ A, Idle @ B, and 2nd Idle @ A since they will all come from Table 2-2. In each case the idle is at 2000 ft and a temperature of 15°C. Consulting the ground idle fuel shown in Table 2-2, the value of 65 lbs/hr is at the intersection of 2000 ft and 15°C.

1st Idle @ A = 1/6 X 65 = 11 lbs

Idle @ B = 1/4 X 65 = 16 lbs

2nd Idle @ A = 1/12 X 65 = 5 lbs

TABLE 2-2

GROUND IDLE FUEL FLOW
AIRCRAFT - OH58C
KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	69	66	61	57	53	50
	-5 C	74	69	64	61	56	52
	15 C	69	65	61	56	53	49
	35 C	57	54	51	47	44	41

ENTRIES ARE AIRCRAFT FUEL FLOW RATES IN LBS/HR

TABLE 2-3

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	126	132	121	110	115	127	169	221
2,200	130	147	131	115	119	128	172	226
2,400	139	162	141	120	122	131	175	231
2,600	152	171	147	123	124	135	179	239
2,800	163	180	153	126	126	143	183	246
3,000	171	192	160	127	127	150	189	253
3,200	178	206	168	131	130	159	197	258

TABLE 2-4

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	135	138	126	114	121	136	180	235
2,200	137	144	132	119	125	137	183	240
2,400	141	161	143	125	129	139	186	245
2,600	150	175	152	129	132	141	188	250
2,800	164	184	158	133	134	146	192	257
3,000	175	193	164	135	135	153	197	265
3,200	183	205	171	137	137	161	203	272

Notice the conversion from minutes to hours. These values must be used because fuel flow is in lbs/hr.

f. The fuel flow for leg A-B of the mission is calculated next. This leg takes place at an altitude of 4,000 ft. and a temperature of 15°C. Thus the necessary information is contained in Table 2-3. Leg A-B is at 70 kts and 3,000 lbs. This is not one of the values given but 60 kts is 127 lb/hr and 80 kts is 150 lb/hr. Interpolation gives the value of 139 lb/hr for a 70 kts airspeed. Since the leg is a half hour long:

Leg A-B = 1/2 X 139 = 70 lbs

g. Leg B-C is calculated next. Since this takes place at a 3,000 ft. altitude, it is necessary to interpolate between Table 2-3 (4,000 ft) and Table 2-4 (2,000 ft). From Table 2-3 the value for 4,000 ft, 15°C, 40 kts and 3,000 lbs is 127 lb/hr. From Table 2-4 the value for 2,000 ft, 15°C, 40 kts and 3,000 lbs is 135 lb/hr. Interpolation gives the value of 131 lb/hr for a 3,000 ft altitude. Since the leg is one hour long:

Leg B-C = 1 X 131 = 131 lbs

h. HIGE at C is calculated next. Since this occurs at 2,000 ft and 15°C the necessary value is found in Table 2-4. At 2,700 lbs, HIGE is the interpolation of the 2,600 lb rate at 150 lb/hr and the 2,800 lb rate at 164 lb/hr. This value is 157 lb/hr. Since the hover is one-third of an hour long:

HIGE @ C = 1/3 X 157 = 52 lbs

i. Leg C-A is the last calculation. Since it takes place at a 3,000 ft altitude, it is once again necessary to interpolate between values from Table 2-3 and Table 2-4. Table 2-3 gives a rate of 124 lb/hr for 4,000 ft, 15°C, 2,600 lbs and 60 kts. Table 2-4 gives a rate of 132 lb/hr for 2,000 ft, 15°C, 2,600 lbs and 60 kts. By interpolation, 128 lb/hr is the value needed. Since the leg is one hour long:

Leg C-A = 1 X 128 = 128 lbs

j. The flight profile can be finished by filling in Table 2-1 as shown in Table 2-5.

TABLE 2-5

Helicopter: OH-58C

Temperature: 15°C

LEG	DISTANCE N.M.	AS KTS	TIME MIN	TIME HR	GW LBS	ALT FT	FUEL LBS
Idle @ A	-	-	10	1/6	-	2000	11
A - B	35	70	30	1/2	3,000	4000	70
Idle @ B	-	-	15	1/4	-	2000	16
B - C	40	40	60	1	3,000	3000	131
HIGE @ C	-	-	20	1/3	2,700	2000	52
C - A	60	60	60	1	2,600	3000	128
Idle @ A	-	-	5	1/12	-	2000	5
						Total	413

k. Although only three look-up tables were used for this example, each type of table has several conditions that are changed so that a wide band of performance parameters can be addressed. The discussion on each of the five types of tables is contained in Chapter 3. A succinct description of each of these five types of tables is:

(1) Basic Fuel Flow Data: Gives the rate the aircraft uses fuel dependent on the given flight conditions.

(2) Delta Fuel Flow for Drag Data: Gives the additional rate of fuel flow to be added to the basic rate for external drag.

(3) Ground Idle Fuel Flow Data: Gives the rate fuel is used when the aircraft is on the ground with its engine running.

(4) Gross Weight Limits Data: A check on whether or not the aircraft has enough lift to take off with a given weight.

(5) Velocity Limits Data: Gives the optimum (long range) speed and maximum rates of speed.

CHAPTER 3

PERFORMANCE DATA TABLE DESCRIPTIONS

1. GENERAL

This chapter describes each of the five basic type tables used for developing flight profiles. The variables within each type of table are described as well as how the specific data required can be extracted.

2. BASIC FUEL FLOW DATA

a. The basic rate of fuel flow* is determined by five variables:

(1) Type of aircraft

(2) Altitude (Air Pressure)**

(3) Temperature***

(4) Gross Weight****

(5) Flight Mode

b. In each table (see Table 3-1) within the basic type, the first three variables are held constant for the whole table, i.e., (a) Type of Aircraft, (b) Altitude (Air Pressure) above sea level, and (c) Temperature. These variables are stated at the top of each table.

c. There seven five rows of fixed gross weights; 2,000 lbs to 3,200 lbs, inclusive, at 200 lb intervals. The ten columns are fixed flight modes.

(1) The first column is Hover In Ground Effect (HIGE). HIGE is used for hovers at a height of 2 feet or less and a component of forward flight 10 kts or less.

(2) The second column is Hover Out of Ground Effect (HOGE). This is used for hovers at a height of more than 2 feet.

**The basic fuel flow data represents a clean drag configuration with all doors closed, no wing stores, and no external sling loads.*

***All altitudes or air pressures are feet above sea level.*

****For simplicity, all temperatures are considered to be the average temperature in which the helicopter is operating (Degrees Centigrade).*

*****Total vehicle weight in pounds.*

(3) The third column is Nap of the Earth (NOE). This is defined as all flight for variable speeds from 0 to 40 kts and variable altitudes.

(4) The remaining seven columns are for given airspeeds* (in kts) as the flight mode.

d. There are 24 of these basic fuel flow charts. Each chart is for a different combination of Air Pressure (Altitude) and Temperature.

e. The Basic Fuel Flow Data is the main table used in simulating a flight profile. For example, assume a pilot's flight path will require 30 minutes of flight at 80 kts airspeed, 4000 ft. altitude, 15°C and a gross weight of 3,000 lbs in an OH-58C helicopter. Using Table 3-1 at a gross weight of 3,000 lbs and an airspeed of 80 kts, the helicopter will use 150 lbs/hr fuel, i.e., for 30 minutes, 75 lbs of fuel will be used.

f. The gross weights values selected provide the basic range of load carrying capability for the ten flight modes of the KIOWA helicopter. Within the gross weight band shown, linear interpolation** is quite accurate for estimating the fuel flow rates.

g. For example, using Table 3-1, if the helicopter's gross weight was 2,900 lbs and if the flight mode was 80 kts, the fuel flow cannot be found directly. But by interpolating between 80 kts, 2,800 lbs - 143 lbs/hr and 3,000 lbs - 150 lbs/hr, the basic fuel flow rate for 2,900 lbs is 147 lbs/hr. In this example, if the helicopter flies in this mode for 30 minutes, 74 lbs of fuel will be used.

h. As altitude and/or temperature changes occur, different tables are used to look up the aircraft's basic fuel flow rate for each leg of the flight path. Care must be taken that the proper table is used.

i. Appendix A contains a set of functions that will give a good approximation of the basic rate of fuel flow.

3. DELTA FUEL FLOW FOR DRAG DATA

a. The delta fuel flow for drag is also determined by five variables:

(1) Type of Aircraft

(2) Altitude (Air Pressure)

(3) Temperature

(4) Drag Surface (Equivalent Square Footage)

(5) Air Speed

---

* *All references to airspeeds are to true airspeeds.*

***All references to interpolation are linear interpolations. See FPPH, Volume I, Chapter 3 for a discussion on the accuracy of interpolation.*

TABLE 3-1

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	126	132	121	110	115	127	169	221
2,200	130	147	131	115	119	128	172	226
2,400	139	162	141	120	122	131	175	231
2,600	152	171	147	123	124	135	179	239
2,800	163	180	153	126	126	143	183	246
3,000	171	192	160	127	127	150	189	253
3,200	178	206	168	131	130	159	197	258

b. Like the basic fuel flow tables, there are 24 tables for delta fuel flow for drag.

c. There are two fixed rows of equivalent square feet of drag: 5.0 equivalent sq ft, and 10.0 equivalent sq ft.

d. The five columns are for airspeeds in kts of: 40 kts, 60 kts, 80 kts, 100 kts, and 120 kts.

e. When an external load is placed on the helicopter, the amount of fuel consumed per hour increases. The delta fuel flow for drag tables indicate how much extra fuel consumption to add to the basic fuel flow rate.

f. In the example given earlier, a 30 minute flight at 80 kts airspeed, 4000 ft altitude, 15°C and a gross weight of 3,000 lbs was used. Using the basic fuel flow tables, the basic fuel flow rate was 150 lbs/hr. Assuming for this new example that part of the load is external and inducing a 5.0 equivalent sq ft external drag, the delta fuel flow for drag (Table 3-2) shows 10 lbs/hr should be added to the basic fuel flow rate. Thus the basic fuel flow rate becomes 150 + 10 or 160 lbs per hour and for a half-hour flight, 80 lbs of fuel will be used instead of the 75 lbs figured without an external load.

g. Appendix B contains a function that will give a good approximation of the delta fuel flow for drag.

4. GROUND IDLE FUEL FLOW DATA

a. The ground idle fuel flow rate is determined by only three variables:

(1) Type of Aircraft

(2) Altitude (Air Pressure)

(3) Temperature

b. There is only one ground idle fuel flow table (shown as Table 2-2). The table has four rows of temperatures: -25°C, -5°C, 15°C and 35°C, and six columns of altitudes: Sea Level, 2000 ft, 4000 ft., 6000 ft., 8000 ft., and 10000 ft.

c. The ground idle fuel flow table is used as discussed in the example flight profile in Chapter 2 (Table 2-2). The OH-58C helicopter idling for 20 minutes at 2000 ft. altitude and 15°C, (across the row labeled 15°C and down the column labeled 2000) find the intersection at 65. Thus, the OH-58C uses 65 lbs/hr at these conditions and since it is idling for 20 minutes or 1/3 of an hour, it will use 22 lbs of fuel.

d. If the helicopter had only been 1000 ft. above sea level, the consumption rate would be found by interpolating between the sea level rate of 69 lbs/hr and the 2000 ft. rate of 65 lbs/hr which would be 67 lbs/hr. In 1/3 of an hour 22 lbs of fuel would be used.

e. Appendix C contains a function that will give a good approximation of the ground idle fuel flow.

5. GROSS WEIGHT LIMITS DATA

a. Gross weight limits tables are intended to show whether or not the aircraft can safely take off for four sets of criteria. These criteria are defined in the following paragraphs:

(1) Criteria #1 is based on the helicopter using 100% of Maximum Power for take off and having enough power to lift straight up and above ground effect (See Figure 3-1). Once it is hovering above ground effect the helicopter begins forward flight until it acquires, transitional lift and is able to climb at 450 ft/min (a desired standard rate of climb) to the desired altitude. This criteria has some risk since the pilot has no reserve power. It has less risk than Criteria #3 but more than Criteria #2 thus it is considered to be "Middle of the Road" risk.

(2) Criteria #2 (Figure 3-1) is based on the helicopter using 95% of Maximum Power for take off and having enough power to immediately begin to climb at a rate of 450 ft/min. This is the least risky criteria since the pilot has power in reserve and is still able to climb at a satisfactory rate.

(3) Criteria #3 (Figure 3-1) has the most risk. Using 100% of Maximum Power the helicopter will only hover in ground effect. Therefore, at an altitude of 2 feet or less, the pilot must begin forward flight and gradually increase airspeed to acquire transitional lift to climb. The reasons for its high risk are readily apparent. First, there is no power in reserve. Second, the pilot must begin forward flight at a very low altitude.

(4) Criteria #4. Structural Gross Weight Limit is the total upper limit of gross weight the helicopter can carry under any take off criteria.

b. Gross Weight Limits are determined by four variables:

(1) Type of Aircraft

(2) Criteria Chosen

(3) Altitude (Air Pressure)

(4) Temperature

TABLE 3-2

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

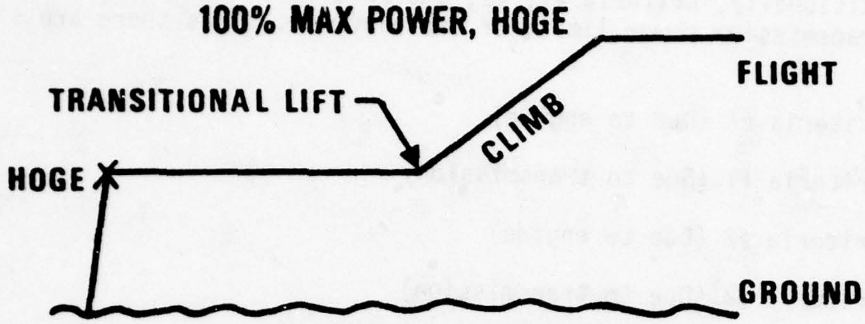
KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	5	10	20	41
	10.0	3	9	29	43	158

CRITERIA #1

(MIDDLE OF THE ROAD)

100% MAX POWER, HOGE

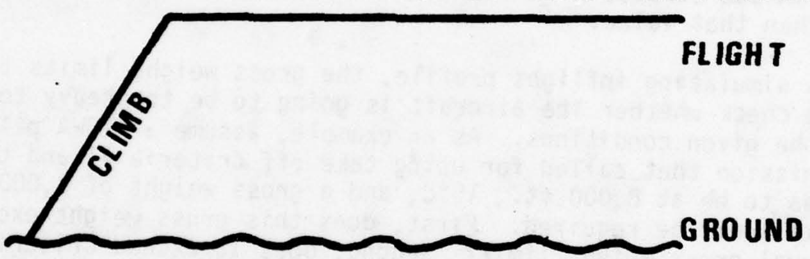


NOTHING TO SPARE.

CRITERIA #2

(LEAST RISKY)

95% OF RATED POWER. VERTICAL RATE OF CLIMB 450 FT/MIN. HOGE

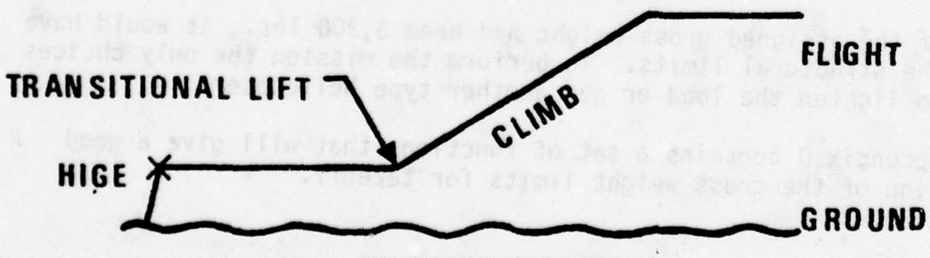


POWER LEFT

CRITERIA #3

(MOST RISKY)

100% MAX POWER, HIGE



NOTHING TO SPARE.

Figure 3-1

c. Additionally, Criteria #1, #2, and #3 differ due to engine power limits or transmission power limits of the aircraft. Thus there are six tables:

(1) Criteria #1 (Due to engine)

(2) Criteria #1 (Due to transmission)

(3) Criteria #2 (Due to engine)

(4) Criteria #2 (Due to transmission)

(5) Criteria #3 (Due to engine)

(6) Criteria #3 (Due to transmission)

d. The structural gross weight limit is a single value for each helicopter and is only dependent on the type helicopter. The KIOWA structural gross weight limit is given as 3,200 lbs and is listed at the bottom of each table. As the name implies, it is simply not safe to expect the OH-58C structure to maneuver normally when the total weight is larger than that value.

e. In simulating inflight profile, the gross weight limits tables are used to check whether the aircraft is going to be too heavy to take off under the given conditions. As an example, assume a KIOWA pilot planned a mission that called for using take off criteria #1 and the take off was to be at 8,000 ft., 15°C, and a gross weight of 3,000. Three checks would be required: First, does this gross weight exceed the structural gross weight limit? Second, does it exceed Criteria #1 (due to transmission)? Third, does it exceed Criteria #1 (due to engine)? In the example given, the answer to all three questions is "No", the take off will not exceed aircraft limits. (Tables 3-3 and 3-4)

f. If the assigned gross weight had been 3,100 lbs, it would have exceeded the value given for 8,000 ft. and 15°C at Criteria #1 (Due to engine). (Table 3-3) The mission could not be flown as planned. The plan could be changed, for example to take off at 6,000 ft. (which might not be practical) or change to take off Criteria #3 (which is more risky but has higher limits).

g. If the assigned gross weight had been 3,300 lbs., it would have exceeded the structural limits. To perform the mission the only choices would be to lighten the load or get another type helicopter.

h. Appendix D contains a set of functions that will give a good approximation of the gross weight limits for takeoff.

TABLE 3-3

GROSS WEIGHT LIMITS

(DUE TO ENGINE)

FOR TAKEOFF CRITERIA #1

100% OF MAXIMUM POWER (HOGE)

AIRCRAFT - OH58C

KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	4738	4413	4102	3808	3526	3262
	-5 C	4444	4136	3838	3557	3287	3029
	15 C	4114	3820	3540	3272	3021	2761
	35 C	3754	3469	3201	2947	2706	2482

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

TABLE 3-4

GROSS WEIGHT LIMITS

(DUE TO TRANSMISSION)

FOR TAKEOFF CRITERIA #1

100% OF MAXIMUM POWER (HOGE)

AIRCRAFT - OH58C

KIOWA

TEMPERATURE DEGREES CENTIGRADE		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
	-25 C	3746	3673	3588	3498	3398	3295
	-5 C	3668	3584	3495	3396	3293	3193
	15 C	3585	3497	3400	3299	3200	3102
	35 C	3504	3409	3309	3211	3115	3016

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

6. VELOCITY LIMITS DATA

a. There are various types of data given in these tables but like the gross weight limits tables, they are primarily restraints on what can be expected of a helicopter in planning a mission profile. Velocity limits tables are influenced by five variables:

(1) Type of aircraft

(2) Air pressure (altitude)

(3) Temperature

(4) Gross weight

(5) Condition or limit

b. Items (1) through (4) are self-explanatory. There are five types of information that can be listed under (5):

(1) Long range

(2) Maximum continuous power

(3) Maximum power (due to engine limits)

(4) Transmission limits

(5) V_{ne}(velocity never exceed)

c. For each aircraft, there are 24 Velocity Limits Tables depending on air pressure and temperature combination. Table 3-5 is an example of the content of the Velocity Limits Table.

d. The two columns under Long Range (Table 3-5) give the optimum speed and fuel flow for each set of variables #1 through #4 above. Thus the KIOWA helicopter operating at 2000 ft., temperature 15°C, and having a gross weight of 3,000 lbs will fly a longer distance if the velocity is kept at 83 kts and will use 161 lbs/hr of fuel at that velocity.

e. Maximum continuous power gives the fastest speed at which a helicopter can fly for long periods (30 minutes or more) and the associated fuel flow rate. An example from Table 3-5 would be a KIOWA helicopter at 2000 ft. and 15°C weighing 3,000 lbs could fly 110 kts with a fuel usage of 224 lbs/hr.

TABLE 3-5

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	154	117	224	125	257	117	225	124	257
2,200	90	156	116	224	123	257	116	225	124	262
2,400	83	145	115	224	122	257	115	225	124	267
2,600	82	146	114	224	121	257	114	225	124	271
2,800	82	151	112	224	120	257	112	225	124	274
3,000	83	161	110	224	118	257	110	225	124	276
3,200	96	195	108	224	116	257	108	225	124	281

f. Maximum power (engine and transmission limits) show the maximum speeds the aircraft can structurally attain for short periods of time (less than 30 minutes). Thus the KIOWA helicopter at 2000 ft and 15°C weighing 3,000 lbs has an engine that is capable of producing enough power to fly 118 kts but the transmission limits the aircraft to 110 kts. Between these two columns then, the flight cannot exceed 110 kts with a fuel flow rate of 225 lbs/hr.

g. There is another limiting factor called V_{ne} (velocity never exceed). This velocity limit is determined by helicopter structural considerations. V_{ne}'s for the KIOWA are used just like the limits in f. above.

7. DETAILED FLIGHT PROFILE USING ALL PERFORMANCE DATA TABLES

The example of a Flight Profile in Chapter 2 was intentionally simplified to assure clarity. The description of the various tables in this handbook, however, indicates a more complex set of considerations are normally encountered in developing the flight profile. With the description provided in this chapter, additional information should be included in the flight plan beyond that shown in the example and a suggested format is provided below in Table 3-6.

TABLE 3-6

Helicopter:
Altitude:
Temperature:

LEG	DISTANCE	AS	CHECK VELOCITY LIMIT	TIME	GW (LBS)	DRAG	FUEL

Needed for each take off:
Weight at take off:
Type of take off:
Check transmission limits:
Check engine limits:
Check structural gross weight limit:

CHAPTER 4

KIOWA PERFORMANCE DATA TABLES

GENERAL

The following tables are the major information presented in this handbook. If the procedure for using them is understood, a flight profile for the KIOWA helicopter can be prepared in a matter of a few hours. The performance data contained have been reviewed for accuracy and are corrected to the best of our knowledge. The tables are organized in the following manner:

Tables 4-1 to 4-24	Basic Fuel Flow Data
Tables 4-25 to 4-48	Delta Fuel Flow for Drag Data
Table 4-49	Ground Idle Fuel Flow Data
Tables 4-50 to 4-55	Gross Weight Limits Data
Tables 4-56 to 4-79	Velocity Limits Data

BASIC FUEL FLOW DATA

TABLES

TABLE 4-1

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: SEA LEVEL   TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	134	136	127	117	122	138	192	274
2,200	136	142	131	121	127	142	199	277
2,400	140	155	140	125	131	149	204	281
2,600	148	169	149	129	134	156	209	289
2,800	160	179	155	132	135	161	212	298
3,000	171	187	161	134	136	167	216	312
3,200	179	196	166	136	137	172	220	327

TABLE 4-2

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: SEA LEVEL TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	138	141	130	119	124	141	191	263
2,200	141	145	134	122	130	143	196	271
2,400	143	156	141	127	134	146	200	276
2,600	149	170	151	132	136	150	203	280
2,800	161	184	160	136	139	155	206	283
3,000	173	192	166	139	140	161	209	285
3,200	183	200	170	140	141	167	214	287

TABLE 4-3

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: SEA LEVEL   TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	142	146	133	120	127	145	191	249
2,200	145	149	137	124	131	147	195	254
2,400	147	157	143	129	135	148	197	258
2,600	152	175	155	135	139	149	200	264
2,800	162	188	164	139	142	152	202	269
3,000	175	197	170	143	144	156	207	276
3,200	187	206	176	145	146	164	211	284

TABLE 4-4

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: SEA LEVEL TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	145	150	136	122	128	149	187	242
2,200	150	153	140	126	132	150	191	245
2,400	152	162	147	132	136	151	195	249
2,600	155	177	157	137	140	152	198	252
2,800	164	192	167	142	144	153	202	257
3,000	177	203	175	146	147	156	206	262
3,200	190	212	181	150	150	161	210	271

TABLE 4-5

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	126	130	121	112	117	131	183	257
2,200	129	142	129	115	122	138	189	261
2,400	137	156	138	119	124	145	194	268
2,600	148	166	144	123	125	150	197	277
2,800	160	175	150	125	126	156	201	291
3,000	167	183	155	126	128	161	205	306
3,200	174	193	161	128	130	165	210	329

TABLE 4-6

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 2000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	131	134	123	113	120	133	181	250
2,200	133	143	130	117	124	136	185	256
2,400	138	157	140	122	126	139	188	260
2,600	149	171	149	126	129	144	192	263
2,800	162	179	154	129	130	150	195	265
3,000	171	188	159	131	131	156	200	267
3,200	178	199	166	132	133	164	205	272

TABLE 4-7

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	135	138	126	114	121	136	180	235
2,200	137	144	132	119	125	137	183	240
2,400	141	161	143	125	129	139	186	245
2,600	150	175	152	129	132	141	188	250
2,800	164	184	158	133	134	146	192	257
3,000	175	193	164	135	135	153	197	265
3,200	183	205	171	137	137	161	203	272

TABLE 4-8

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	138	141	129	116	122	139	177	227
2,200	141	148	135	122	126	140	181	231
2,400	144	163	145	127	130	141	184	234
2,600	152	178	155	132	134	142	188	239
2,800	165	189	163	136	137	146	192	244
3,000	178	199	169	139	139	151	196	253
3,200	187	212	176	141	141	160	203	266

TABLE 4-9

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	119	128	117	106	112	126	175	241
2,200	125	143	127	110	115	133	179	247
2,400	137	153	134	114	116	139	183	257
2,600	148	162	139	116	117	145	187	270
2,800	156	171	144	117	119	150	190	286
3,000	162	181	150	119	121	154	196	309
3,200	170	192	158	124	127	158	202	322

TABLE 4-10

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	123	130	119	108	114	125	171	237
2,200	127	144	128	113	117	128	174	241
2,400	138	158	138	117	120	133	178	244
2,600	150	166	143	120	121	139	181	246
2,800	160	175	148	122	122	145	186	249
3,000	166	186	155	123	124	153	191	254
3,200	174	198	163	127	127	158	197	270

TABLE 4-11

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT   TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	126	132	121	110	115	127	169	221
2,200	130	147	131	115	119	128	172	226
2,400	139	162	141	120	122	131	175	231
2,600	152	171	147	123	124	135	179	239
2,800	163	180	153	126	126	143	183	246
3,000	171	192	160	127	127	150	189	253
3,200	178	206	168	131	130	159	197	258

TABLE 4-12

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	130	135	123	112	116	130	167	214
2,200	133	149	133	117	120	131	171	217
2,400	140	164	143	122	124	132	174	222
2,600	153	175	151	127	127	135	178	227
2,800	166	185	157	129	129	143	183	236
3,000	175	198	165	131	131	150	189	249
3,200	183	214	174	135	134	164	200	262

TABLE 4-13

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 6000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	114	130	116	101	106	122	166	228
2,200	125	141	123	105	108	128	169	237
2,400	137	150	129	108	109	134	173	250
2,600	145	159	134	109	110	139	177	265
2,800	151	169	140	111	113	143	182	289
3,000	159	180	148	116	119	147	188	302
3,200	167	194	160	126	126	151	196	325

TABLE 4-14

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	117	130	117	104	108	118	161	223
2,200	126	145	127	108	111	123	164	226
2,400	139	154	133	111	112	129	168	228
2,600	148	162	138	113	113	135	173	231
2,800	155	174	144	115	115	143	178	236
3,000	162	186	153	119	119	148	184	254
3,200	171	201	165	128	127	153	192	291

TABLE 4-15

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	119	132	119	106	109	119	159	209
2,200	127	149	130	111	113	121	162	214
2,400	140	156	136	114	115	125	166	221
2,600	151	167	142	116	117	132	170	229
2,800	159	179	149	118	118	140	176	235
3,000	166	193	158	122	121	149	184	240
3,200	176	210	171	132	131	158	196	264

TABLE 4-16

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 6000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	122	135	122	108	111	121	158	201
2,200	129	151	132	113	114	122	161	205
2,400	141	162	140	117	118	125	165	210
2,600	154	172	146	120	120	133	170	219
2,800	163	185	154	122	122	140	176	232
3,000	171	201	163	126	125	154	188	244
3,200	182	228	179	138	134	163	201	259

TABLE 4-17

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 8000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	114	129	113	97	100	118	156	217
2,200	126	138	119	100	101	123	160	230
2,400	134	147	124	101	102	128	164	245
2,600	140	157	130	103	105	133	169	269
2,800	148	168	138	109	111	137	175	282
3,000	157	183	150	118	119	141	184	306
3,200	166	201	164	127	127	146	196	337

TABLE 4-18

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 8000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	115	132	116	99	102	113	152	209
2,200	127	142	122	103	104	118	155	211
2,400	137	150	127	104	105	125	160	214
2,600	144	161	134	106	107	132	165	219
2,800	151	174	143	111	111	137	171	239
3,000	160	190	155	121	119	143	180	278
3,200	171	210	171	132	131	151	196	313

TABLE 4-19

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 8000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	116	135	118	102	104	112	149	197
2,200	128	145	125	106	106	115	153	204
2,400	140	154	131	108	108	122	157	212
2,600	147	166	138	110	110	130	163	218
2,800	155	180	147	114	113	139	171	223
3,000	165	199	162	125	123	148	184	253
3,200	177	219	173	138	135	156	203	310

TABLE 4-20

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 8000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	118	137	120	103	105	113	149	189
2,200	129	149	129	108	109	116	152	194
2,400	143	159	135	111	111	121	157	202
2,600	151	172	143	113	113	130	164	216
2,800	160	188	153	118	117	144	175	227
3,000	171	208	170	131	127	153	190	248
3,200	183	227	186	144	142	166	216	317

TABLE 4-21

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 10000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	114	126	109	92	93	113	147	210
2,200	123	135	114	93	94	118	151	225
2,400	130	145	120	95	97	123	156	248
2,600	137	156	128	101	103	127	162	262
2,800	146	171	141	111	111	131	171	287
3,000	155	183	154	119	119	137	183	318
3,200	167	205	106	126	126	147	191	358

TABLE 4-22

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 10000 FT   TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	115	130	112	95	96	109	143	195
2,200	126	138	117	97	97	115	147	197
2,400	133	149	124	98	99	122	153	203
2,600	141	161	132	103	103	127	159	222
2,800	150	178	146	113	111	133	168	264
3,000	160	196	160	124	123	142	185	298
3,200	173	220	176	132	130	152	198	353

TABLE 4-23

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 10000 FT   TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	116	133	115	97	98	106	141	187
2,200	128	142	121	100	100	113	145	195
2,400	136	154	128	101	101	120	151	202
2,600	144	167	137	106	105	129	159	207
2,800	154	187	152	117	115	137	171	241
3,000	166	204	167	130	128	147	193	299
3,200	180	235	186	138	137	163	210	367

TABLE 4-24

BASIC FUEL FLOW

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 10000 FT   TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	FLIGHT MODE (KTS)							
	HIGE	HOGE	NOE	40	60	80	100	120
2,000	117	136	118	99	100	106	140	179
2,200	131	146	124	103	103	111	145	186
2,400	140	159	132	105	104	120	151	199
2,600	148	174	142	109	108	134	162	210
2,800	159	196	160	123	120	143	178	237
3,000	172	212	173	135	134	157	205	307
3,200	189	258	201	144	144	176	243	400

DELTA FUEL FLOW FOR DRAG DATA
TABLES

TABLE 4-25

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: SEA LEVEL   TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	7	18	30	130
	10.0	4	11	40	70	289

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TABLE 4-26

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: SEA LEVEL TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	7	11	26	73
	10.0	4	12	34	56	225

TABLE 4-27

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: SEA LEVEL TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	6	6	23	49
	10.0	4	12	25	49	172

TABLE 4-28

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: SEA LEVEL TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	6	4	24	53
	10.0	3	12	15	47	115

TABLE 4-29

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 2000 FT   TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	5	22	29	132
	10.0	4	8	38	66	280

TABLE 4-30

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 2000 FT   TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	6	15	25	77
	10.0	4	9	35	54	214

TABLE 4-31

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	6	8	21	45
	10.0	3	10	27	46	165

TABLE 4-32

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	6	4	21	50
	10.0	3	11	17	43	113

TABLE 4-33

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 4000 FT   TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	3	21	27	132
	10.0	3	5	34	61	270

TABLE 4-34

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 4000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	4	17	24	80
	10.0	3	7	34	53	204

TABLE 4-35

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	5	10	20	41
	10.0	3	9	29	43	158

TABLE 4-36

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 4000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	2	5	4	18	46
	10.0	3	9	19	39	113

TABLE 4-37

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 6000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	2	18	26	128
	10.0	3	4	29	54	256

TABLE 4-38

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

DRAG IN SQUARE FEET		AIR SPEED IN KTS				
		40	60	80	100	120
	5.0	2	3	18	23	83
	10.0	3	5	32	50	194

TABLE 4-39

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	4	12	19	39
	10.0	3	6	29	41	152

TABLE 4-40

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 6000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	4	6	17	42
	10.0	3	7	21	37	113

TABLE 4-41

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 8000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	1	15	25	122
	10.0	2	4	25	49	240

TABLE 4-42

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	2	17	21	76
	10.0	2	3	28	48	186

TABLE 4-43

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 8000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	3	14	19	38
	10.0	2	4	28	39	145

TABLE 4-44

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 8000 FT   TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

DRAG IN SQUARE FEET		AIR SPEED IN KTS 40	60	80	100	120
	5.0	1	3	8	16	38
	10.0	2	6	23	34	114

TABLE 4-45

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 10000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	1	12	24	114
	10.0	1	5	21	44	223

TABLE 4-46

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 10000 FT   TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	1	15	20	78
	10.0	1	3	24	46	179

TABLE 4-47

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 10000 FT   TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

		AIR SPEED IN KTS				
		40	60	80	100	120
DRAG IN SQUARE FEET	5.0	1	2	14	18	40
	10.0	1	3	26	37	159

TABLE 4-48

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 10000 FT   TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

DRAG IN SQUARE FEET		AIR SPEED IN KTS				
		40	60	80	100	120
	5.0	1	2	11	15	52
	10.0	2	3	24	32	106

GROUND IDLE FUEL FLOW DATA

TABLES

TABLE 4-49

GROUND IDLE FUEL FLOW

AIRCRAFT - OH58C

KIOWA

		Pressure Altitude (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	69	66	61	57	53	50
	-5 C	74	69	64	61	56	52
	15 C	69	65	61	56	53	49
	35 C	57	54	51	47	44	41

ENTRIES ARE AIRCRAFT FUEL FLOW RATES IN LBS/HR

GROSS WEIGHT LIMITS DATA

TABLES

TABLE 4-50

GROSS WEIGHT LIMITS
(DUE TO ENGINE)
FOR TAKEOFF CRITERIA #1
100% OF MAXIMUM POWER (HOGE)
AIRCRAFT - OH58C
KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	4738	4413	4102	3806	3526	3262
	-5 C	4444	4136	3838	3557	3287	3029
	15 C	4114	3820	3540	3272	3021	2781
	35 C	3754	3469	3201	2947	2706	2482

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

TABLE 4-51

GROSS WEIGHT LIMITS
(DUE TO TRANSMISSION)
FOR TAKEOFF CRITERIA #1
100% OF MAXIMUM POWER (HOGE)
AIRCRAFT - OH58C
KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	3746	3673	3588	3498	3396	3295
	-5 C	3668	3584	3495	3396	3293	3193
	15 C	3585	3497	3400	3299	3200	3102
	35 C	3504	3409	3309	3211	3115	3016

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

TABLE 4-52

GROSS WEIGHT LIMITS

(DUE TO ENGINE)

FOR TAKEOFF CRITERIA #2

95% OF RATED POWER. VERTICAL RATE OF CLIMB 450 FT/MIN. OGE

AIRCRAFT - OH58C

KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	4342	4046	3761	3492	3233	2990
	-5 C	4079	3797	3523	3265	3016	2778
	15 C	3775	3505	3247	3000	2764	2547
	35 C	3434	3171	2923	2687	2464	2257

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

TABLE 4-53

GROSS WEIGHT LIMITS

(DUE TO TRANSMISSION)

FOR TAKEOFF CRITERIA #2

TRANSMISSION POWER LIMIT. VERTICAL RATE OF CLIMB 450 FT/MIN. OGE

AIRCRAFT - OH58C

KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	3479	3419	3360	3287	3210	3124
	-5 C	3415	3356	3285	3209	3123	3033
	15 C	3357	3286	3212	3128	3039	2951
	35 C	3292	3219	3137	3049	2962	2876

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

TABLE 4-54

GROSS WEIGHT LIMITS
(DUE TO ENGINE)
FOR TAKEOFF CRITERIA #3
100% OF MAXIMUM POWER (HIGE)
AIRCRAFT - OH58C
KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	5529	5150	4767	4444	4115	3806
	-5 C	5186	4827	4479	4151	3836	3535
	15 C	4802	4458	4132	3819	3526	3246
	35 C	4379	4046	3732	3434	3152	2889

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

TABLE 4-55

GROSS WEIGHT LIMITS
(DUE TO TRANSMISSION)
FOR TAKEOFF CRITERIA #3
100% OF MAXIMUM POWER (HIGE)
AIRCRAFT - OH58C
KIOWA

		PRESSURE ALTITUDE (FT)					
		SEA LEVEL	2000	4000	6000	8000	10000
TEMPERATURE DEGREES CENTIGRADE	-25 C	4347	4270	4168	4067	3960	3844
	-5 C	4263	4163	4064	3958	3844	3716
	15 C	4164	4060	3962	3850	3725	3595
	35 C	4074	3972	3862	3740	3611	3487

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 3200 LBS

VELOCITY LIMITS DATA

TABLES

TABLE 4-56

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: SEA LEVEL   TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	142	123	283	126	320	110	225	111	231
2,200	81	146	121	283	124	320	108	225	111	239
2,400	82	154	120	283	123	320	106	225	111	247
2,600	82	163	119	283	122	320	105	225	111	254
2,800	76	151	118	283	121	320	103	225	111	260
3,000	74	151	117	283	120	320	103	225	111	265
3,200	73	155	116	283	120	320	102	225	111	269

TABLE 4-57

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: SEA LEVEL TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	90	161	121	272	126	288	112	227	116	241
2,200	82	148	120	272	125	288	110	227	116	247
2,400	82	151	119	272	124	288	109	227	116	253
2,600	82	154	118	272	123	288	108	227	116	258
2,800	82	160	117	272	122	288	107	227	116	264
3,000	83	168	116	272	121	288	106	227	116	270
3,200	85	179	115	272	120	288	104	227	116	277

TABLE 4-58

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: SEA LEVEL TEMPERATURE: 15 C
AIRCRAFT - OH58C
KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	160	118	243	125	277	115	230	120	249
2,200	91	167	117	243	124	277	113	230	120	254
2,400	88	164	116	243	123	277	112	230	120	258
2,600	83	156	115	243	122	277	111	230	120	264
2,800	82	157	114	243	121	277	110	230	120	269
3,000	82	162	112	243	120	277	108	230	120	276
3,200	83	172	111	243	119	277	107	230	120	284

TABLE 4-59

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: SEA LEVEL TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	159	111	214	123	251	117	232	124	256
2,200	91	162	110	214	122	251	116	232	124	260
2,400	91	166	108	214	121	251	115	232	124	264
2,600	92	172	107	214	120	251	114	232	124	269
2,800	90	174	106	214	118	251	112	232	124	274
3,000	83	165	104	214	117	251	111	232	124	282
3,200	82	167	102	214	115	251	108	232	124	292

TABLE 4-60

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	81	134	121	262	125	300	112	222	115	242
2,200	81	142	120	262	124	300	110	222	115	250
2,400	82	150	119	262	123	300	108	222	115	253
2,600	76	141	118	262	122	300	107	222	115	255
2,800	74	141	117	262	121	300	106	222	115	257
3,000	73	145	116	262	120	300	105	222	115	260
3,200	95	196	115	262	118	300	103	222	115	268

TABLE 4-61

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	138	120	252	126	268	114	223	120	250
2,200	82	140	119	252	125	268	113	223	120	256
2,400	82	143	118	252	124	268	112	223	120	260
2,600	82	149	117	252	123	268	111	223	120	263
2,800	83	157	116	252	122	268	110	223	120	265
3,000	85	166	114	252	120	268	108	223	120	267
3,200	76	154	113	252	119	268	106	223	120	272

TABLE 4-62

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	154	117	224	125	257	117	225	124	257
2,200	90	156	116	224	123	257	116	225	124	262
2,400	83	145	115	224	122	257	115	225	124	267
2,600	82	146	114	224	121	257	114	225	124	271
2,800	82	151	112	224	120	257	112	225	124	274
3,000	83	161	110	224	118	257	110	225	124	276
3,200	96	195	108	224	116	257	108	225	124	281

TABLE 4-63

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	150	109	197	121	232	120	227	123	236
2,200	91	154	108	197	120	232	119	227	123	240
2,400	92	159	107	197	119	232	118	227	123	244
2,600	90	162	105	197	118	232	116	227	123	249
2,800	83	153	103	197	116	232	115	227	123	256
3,000	82	157	100	197	114	232	112	227	123	266
3,200	84	170	97	197	111	232	110	227	123	278

TABLE 4-64

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 4000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	81	130	120	243	124	279	114	222	120	240
2,200	82	138	119	243	123	279	112	222	120	246
2,400	76	131	118	243	122	279	111	222	120	255
2,600	74	131	117	243	121	279	110	222	120	268
2,800	74	135	116	243	120	279	109	222	120	283
3,000	96	186	114	243	118	279	107	222	120	307
3,200	93	183	113	243	117	279	105	222	120	320

TABLE 4-65

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 4000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	129	119	232	125	248	117	221	125	248
2,200	82	132	118	232	124	248	116	221	125	251
2,400	82	138	117	232	123	248	114	221	125	256
2,600	83	145	116	232	121	248	113	221	125	265
2,800	84	154	114	232	120	248	112	221	125	280
3,000	76	145	112	232	118	248	110	221	125	302
3,200	95	185	110	232	116	248	108	221	125	336

TABLE 4-66

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	146	116	207	124	238	120	222	122	232
2,200	83	135	114	207	122	238	119	222	122	238
2,400	82	136	113	207	121	238	118	222	122	243
2,600	82	140	111	207	120	238	116	222	122	249
2,800	83	150	109	207	118	238	114	222	122	254
3,000	101	192	107	207	116	238	112	222	122	257
3,200	105	211	104	207	113	238	109	222	122	267

TABLE 4-67

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 4000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	142	106	181	120	214	123	223	119	211
2,200	92	147	106	181	119	214	122	223	119	215
2,400	91	151	104	181	117	214	120	223	119	219
2,600	83	142	102	181	116	214	119	223	119	224
2,800	82	146	99	181	113	214	116	223	119	233
3,000	85	161	96	181	110	214	113	223	119	246
3,200	111	230	91	181	106	214	109	223	119	260

TABLE 4-68

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT   TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	127	119	224	123	260	116	219	124	279
2,200	78	124	118	224	122	260	115	219	124	298
2,400	74	121	117	224	121	260	114	219	124	303
2,600	74	125	116	224	120	260	112	219	124	316
2,800	97	175	114	224	118	260	111	219	124	333
3,000	93	170	112	224	116	260	109	219	124	351
3,200	92	176	110	224	114	260	107	219	124	375

TABLE 4-69

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	122	118	214	124	230	120	222	122	228
2,200	82	127	117	214	123	230	119	222	122	230
2,400	83	134	115	214	121	230	117	222	122	232
2,600	84	142	114	214	120	230	116	222	122	239
2,800	77	136	112	214	118	230	114	222	122	254
3,000	95	173	109	214	116	230	111	222	122	282
3,200	94	178	106	214	113	230	108	222	122	313

TABLE 4-70

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	84	126	114	190	122	219	123	222	119	205
2,200	82	126	113	190	121	219	122	222	119	209
2,400	82	129	111	190	120	219	120	222	119	216
2,600	83	140	109	190	118	219	118	222	119	224
2,800	102	180	106	190	115	219	116	222	119	233
3,000	106	199	103	190	112	219	113	222	119	238
3,200	97	189	97	190	107	219	108	222	119	255

TABLE 4-71

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	91	135	105	166	118	196	126	222	115	189
2,200	92	142	103	166	117	196	125	222	115	193
2,400	83	132	101	166	115	196	123	222	115	198
2,600	82	136	98	166	112	196	121	222	115	204
2,800	86	152	94	166	109	196	117	222	115	214
3,000	112	217	89	166	104	196	113	222	115	232
3,200	99	199	83	166	98	196	107	222	115	245

TABLE 4-72

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 8000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	81	119	118	207	122	240	119	211	122	242
2,200	74	112	117	207	121	240	118	211	122	260
2,400	73	116	115	207	120	240	116	211	122	280
2,600	93	154	113	207	118	240	115	211	122	287
2,800	93	159	111	207	116	240	113	211	122	306
3,000	92	164	109	207	114	240	110	211	122	331
3,200	91	169	106	207	111	240	107	211	122	362

TABLE 4-73

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 8000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	116	116	196	123	213	123	213	119	205
2,200	83	124	115	196	121	213	122	213	119	209
2,400	84	132	113	196	120	213	120	213	119	212
2,600	77	127	111	196	118	213	118	213	119	215
2,800	95	160	108	196	115	213	115	213	119	227
3,000	94	167	105	196	112	213	112	213	119	260
3,200	92	175	100	196	107	213	107	213	119	300

TABLE 4-74

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 8000 FT   TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	116	112	174	121	202	126	219	115	182
2,200	82	119	110	174	119	202	125	219	115	186
2,400	83	129	108	174	117	202	123	219	115	192
2,600	102	168	105	174	115	202	120	219	115	203
2,800	98	167	101	174	111	202	117	219	115	215
3,000	97	177	96	174	106	202	112	219	115	223
3,200	93	182	89	174	100	202	106	219	115	265

TABLE 4-75

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 8000 FT TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	92	130	103	152	116	180	130	222	111	168
2,200	84	122	100	152	114	180	128	222	111	173
2,400	82	125	97	152	112	180	125	222	111	179
2,600	87	142	93	152	108	180	122	222	111	187
2,800	102	180	87	152	102	180	117	222	111	202
3,000	98	186	79	152	95	180	110	222	111	224
3,200	92	193	70	152	87	180	102	222	111	246

TABLE 4-76

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 FT TEMPERATURE: -25 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	74	103	116	191	121	221	122	232	119	200
2,200	73	106	115	191	120	221	121	232	119	211
2,400	97	150	113	191	118	221	119	232	119	230
2,600	93	147	111	191	116	221	117	232	119	257
2,800	92	152	108	191	113	221	114	232	119	274
3,000	91	158	105	191	110	221	111	232	119	305
3,200	87	163	100	191	105	221	106	232	119	346

TABLE 4-77

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 FT TEMPERATURE: -5 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	113	115	180	121	197	126	218	115	179
2,200	85	123	113	180	119	197	124	218	115	186
2,400	77	116	111	180	117	197	122	218	115	193
2,600	95	149	108	180	115	197	120	218	115	197
2,800	94	155	104	180	111	197	116	218	115	208
3,000	92	164	98	180	106	197	111	218	115	258
3,200	87	167	92	180	99	197	105	218	115	307

TABLE 4-78

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 FT TEMPERATURE: 15 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	82	109	110	159	119	185	129	212	111	161
2,200	83	118	107	159	117	185	128	212	111	167
2,400	102	154	104	159	114	185	125	212	111	174
2,600	98	155	100	159	111	185	121	212	111	185
2,800	96	164	94	159	105	185	116	212	111	202
3,000	92	171	87	159	97	185	109	212	111	222
3,200	84	172	78	159	89	185	100	212	111	292

TABLE 4-79

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 FT   TEMPERATURE: 35 C

AIRCRAFT - OH58C

KIOWA

GROSS WEIGHTS (LBS)	LONG RANGE		MAX CONTINUOUS POWER		MAX POWER (ENGINE)		TRANSMISSION LIMITS		VELOCITY NEVER EXCEED	
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)
2,000	84	113	99	139	114	165	133	212	107	151
2,200	82	115	95	139	111	165	130	212	107	156
2,400	86	130	91	139	107	165	127	212	107	163
2,600	102	167	85	139	101	165	122	212	107	176
2,800	97	173	75	139	93	165	115	212	107	198
3,000	92	182	68	139	85	165	105	212	107	215
3,200	82	183		139	74	165	94	212	107	300

APPENDIX A

FUNCTIONS FOR CALCULATING BASIC FUEL FLOW

There are four functions that can be used to calculate the basic fuel flow for the OH-58C helicopter. In order to use the functions the following data is needed:

1. Flight Mode

2. Temperature

3. Pressure (altitude)

4. Gross weight

Which of the four functions will be used depends on the flight mode. The first function is for HIGE (Hover In Ground Effect).

$$FF\ (HIGE) = f\ (TEMP, ALT, GW)$$

The second function is for HOGE (Hover Out of Ground Effect).

$$FF\ (HOGE) = f\ (TEMP, ALT, GW)$$

The third function is for NOE (Nap of the Earth).

$$FF\ (NOE) = f\ (TEMP, ALT, GW)$$

The fourth function is for Forward Flight.

$$FF\ (Forward\ Flight) = f\ (AS, TEMP, ALT, GW)$$

The equation for FF (HIGE) is:

$$\begin{aligned} FF\ (HIGE) = {} & A\ (ALT) + B\ (TEMP) + C\ (GW) + D\ (ALT)(TEMP) \\ & + E\ (ALT)\ (GW) + F\ (TEMP)\ (GW) \\ & + G\ (ALT)\ (TEMP)\ (GW) + K \end{aligned}$$

Where ALT is the altitude, TEMP is the temperature and GW is the gross weight and the constants have the following values:

$A = -3.35690356 \times 10^{-3}$ $\quad E = 7.96788235 \times 10^{-7}$

$B = 3.03393278 \times 10^{-1}$ $\quad F = -6.12735748 \times 10^{-5}$

$C = 4.05339114 \times 10^{-2}$ $\quad G = 3.09448307 \times 10^{-8}$

$D = -7.67729362 \times 10^{-5}$ $\quad K = 4.9779171 \times 10$

The equation for FF (HOGE) is exactly the same form as FF (HIGE). A new set of values for the constants is used. These values are:

$A = -5.5852771 \times 10^{-3}$	$E = 2.08401653 \times 10^{-6}$
$B = 1.67285581 \times 10^{-2}$	$F = 6.10961288 \times 10^{-5}$
$C = 5.04578762 \times 10^{-2}$	$G = 3.59950243 \times 10^{-8}$
$D = -7.81789286 \times 10^{-5}$	$K = 3.78567867 \times 10$

The equation for FF (NOE) is once again the same as FF (HIGE). The new values for the constants are:

$A = -5.75599924 \times 10^{-3}$	$E = 1.76571088 \times 10^{-6}$
$B = -6.23920346 \times 10^{-2}$	$F = 8.50775396 \times 10^{-5}$
$C = 3.24936043 \times 10^{-2}$	$G = 1.78953317 \times 10^{-8}$
$D = -3.64564344 \times 10^{-5}$	$K = 6.48977394 \times 10$

For the Forward Flight modes the form of the equation is:

$$FF = A(AS) + B(AS^2) + C(AS^3) + D(TEMP) + E(GW) + F(ALT) + G(AS^3)(TEMP)$$
$$+ H(AS^2)(TEMP) + I(AS)(TEMP) + J(AS^3)(GW) + K(AS^2)(GW)$$
$$+ L(AS)(GW) + M(AS^3)(ALT) + N(AS^2)(ALT) + O(AS)(ALT) + P(TEMP)(GW)$$
$$+ Q(TEMP)(ALT) + R(GW)(ALT) + S(TEMP)(GW)(ALT) + T$$

Where AS is the air speed in kts and the values of the constants are:

$A = -5.95130384$	$K = -2.7866568 \times 10^{-5}$
$B = 8.02528234 \times 10^{-2}$	$L = 1.76113844 \times 10^{-3}$
$C = -2.96284154 \times 10^{-4}$	$M = 6.41974562 \times 10^{-9}$
$D = 1.82957758$	$N = -1.69365617 \times 10^{-6}$
$E = -2.84715621 \times 10^{-2}$	$O = 1.18502416 \times 10^{-4}$
$F = -1.18395233 \times 10^{-2}$	$P = -8.69343166 \times 10^{-5}$
$G = -5.30886314 \times 10^{-6}$	$Q = -2.87983216 \times 10^{-5}$
$H = 1.0526557 \times 10^{-3}$	$R = 2.75237818 \times 10^{-6}$
$I = -6.95590973 \times 10^{-2}$	$S = 1.18165692 \times 10^{-8}$
$J = 1.49119451 \times 10^{-7}$	$T = 2.40500046 \times 10^{2}$

These functions allow anyone with a simple calculator to figure the fuel flow of the aircraft and bypass both looking up the values and interpolating for points in between the data points in the tables.

The above equations calculate the basic fuel flow for the KIOWA helicopter with the following accuracies:

FF (HIGE) - 97.64%

FF (HOGE) - 97.20%

FF (NOE) - 96.02%

FF (Forward Flight) - 98.12%

APPENDIX B

FUNCTION FOR CALCULATING DELTA FUEL FLOW FOR DRAG

The function below will calculate the delta fuel flow for drag for the OH-58C helicopter. Recall from the discussion in chapter three that this value is added to the basic fuel flow value whenever drag is increasing the rate of fuel flow.*

In order to use the function the following data is needed:

1. Air Speed (AS)

2. Equivalent Square Footage of Drag (SQ)

3. Temperature (TEMP) in degrees centigrade

4. Altitude (ALT) in feet above sea level

That is:

$$FF\ (Drag) = f(AS,\ SQ,\ TEMP,\ ALT)$$

The equation for FF (Drag) is:

$$\begin{aligned} FF\ (Drag) = {} & A(AS) + B(AS^2) + C(AS^3) + D(TEMP) + E(SQ) + F(ALT) \\ & + G(AS^3)(TEMP) + H(AS^2)(TEMP) + I(AS)(TEMP) + J(AS^3)(SQ) + K(AS^2)(SQ) \\ & + L(AS)(SQ) + M(AS^3)(ALT) + N(AS^2)(ALT) + O(AS)(ALT) + P(TEMP)(SQ) \\ & + Q(TEMP)(ALT) + R(SQ)(ALT) + S(SQ)(ALT)(TEMP) + T \end{aligned}$$

Where the constants have the following values:

A =	-2.30764812	K =	$-2.65161346 \times 10^{-2}$
B =	$3.56868501 \times 10^{-2}$	L =	1.7109375
C =	$-1.73635332 \times 10^{-4}$	M =	$-1.45386472 \times 10^{-8}$
D =	4.31263679	N =	$2.91107273 \times 10^{-6}$
E =	-3.32975135×10	O =	$-1.91526487 \times 10^{-4}$
F =	$5.30088716 \times 10^{-3}$	P =	$-7.73425018 \times 10^{-2}$
G =	$-1.46625648 \times 10^{-5}$	Q =	$-2.78005934 \times 10^{-5}$
H =	$2.93496606 \times 10^{-3}$	R =	$-2.25866765 \times 10^{-4}$
I =	$-1.88687801 \times 10^{-1}$	S =	$6.03058669 \times 10^{-6}$
J =	$1.34745209 \times 10^{-4}$	T =	3.86664758×10

**There is no delta fuel flow for drag for HIGE, HOGE or NOE flight.*

This equation calculates the delta fuel flow for drag value with an accuracy of 97.41%. It should be noted that in some instances the computed value will be negative. If this occurs, zero (Ø) should be used as the value for delta fuel flow.

APPENDIX C

FUNCTION FOR CALCULATING GROUND IDLE FUEL FLOW

The function below will calculate the ground idle fuel flow rate for the OH-58C helicopter. In order to use the function the following data is needed:

1. Temperature (TEMP) in degrees centigrade.

2. Altitude (ALT) in feet above sea level.

That is:

$$FF\ (Idle) = f\ (TEMP, ALT)$$

The equation, for FF (Idle) is:

$$FF\ (Idle) = A(TEMP) + B(ALT) + C(TEMP)(ALT) + D(TEMP^2) + E(ALT^2) + F$$

Where the constants have the following values:

$A = -1.21517848 \times 10^{-1}$ $D = -8.2291665 \times 10^{-3}$

$B = -2.12115911 \times 10^{-3}$ $E = 1.45087788 \times 10^{-8}$

$C = 5.92857032 \times 10^{-6}$ $F = 7.23118267 \times 10$

This equation calculates the ground idle fuel flow rate with an accuracy of 99.43%.

APPENDIX D

FUNCTIONS FOR CALCULATING GROSS WEIGHT LIMITS FOR TAKEOFF

The functions given below will calculate the gross weight limits for take off for the OH-58C helicopter. Each of the functions is of the same basic form with the values of the constants changing depending on which take off criteria is being used. In all cases the Structural Gross Weight Limit of the OH-58C helicopter is 3,200 lbs.

In order to use the functions the following data is needed:

1. Temperature (TEMP) in degrees centigrade

2. Altitude (ALT) in feet above sea level

That is:

$$GW\ (\text{Limit}) = f\ (\text{TEMP}, \text{ALT})$$

The basic equation for GW (Limit) is:

$$GW\ (\text{Limit}) = A(\text{TEMP}) + B(\text{ALT}) + C(\text{TEMP})(\text{ALT}) + D$$

For take off criteria #1 the equation must be used twice, once using the engine limit constants and once using the transmission limit constants. For take off criteria #1 the constants for engine limits are:

$A = -1.64164283 \times 10$ $\qquad C = 3.47785768 \times 10^{-4}$

$B = -1.39135351 \times 10^{-1}$ $\qquad D = 4.32102252 \times 10^{3}$

For take off criteria #1 the constants for transmission limits are:

$A = -4.25071442$ $\qquad C = -5.78571326 \times 10^{-5}$

$B = -4.73678568 \times 10^{-2}$ $\qquad D = 3.65428928 \times 10^{3}$

For take off criteria #2 two checks must also be made. The constants for engine limits, take off criteria #2 are:

$A = -1.51619046 \times 10$ $\qquad C = 2.99214309 \times 10^{-4}$

$B = -1.27963921 \times 10^{-1}$ $\qquad D = 3.96235706 \times 10^{3}$

For take off criteria #2 the constants for transmission limits are:

$A = -3.17547596$ $\qquad C = -1.11571477 \times 10^{-4}$

$B = -3.85635695 \times 10^{-2}$ $\qquad D = 3.41181781 \times 10^{3}$

Also for take off criteria #3 two checks must be made. The constants for engine limits, take off criteria #3 are:

$A = -1.91778572 \times 10$ $\qquad$ $C = 3.97571526 \times 10^{-4}$

$B = -1.62480704 \times 10^{-1}$ $\qquad$ $D = 5.04252014 \times 10^{3}$

For take off criteria #3 the constants for transmission limits are:

$A = -4.61190426$ $\qquad$ $C = -1.40285785 \times 10^{-4}$

$B = -5.45271398 \times 10^{-2}$ $\qquad$ $D = 4.24803564 \times 10^{3}$

This equation with the various sets of constants gives results that are 99.75% accurate or better.

APPENDIX E

SHORT DESCRIPTION OF KIOWA DATA SOURCE

DRDAV-EQA(A)
SUBJECT: Short Description of OH-58C Performance Data Provided to TRADOC Systems Analysis Activity (TRASANA)

MFR:

1. References:

a. Airworthiness and Flight Characteristics Test Production OH-58A Helicopter Unarmed and Armed with XM27E1 Weapon System; Performance Final Report; USAASTA Project No. 68-30. Sept. 70.

b. Evaluation of an OH-58A Helicopter with an Allison 250-C20B Engine; Final Report; USAASTA Project No. 74-48, Apr. 75.

c. Detail Specification for the OH-58C Interim Scout; Report No. 206-947-203, Sept. 75, (Revision R2, Mar. 77)

d. Operator's Manual, Army OH-58C Helicopter; TM55-1520-235-10, Apr. 78.

e. Determination of the Effects of Rotor Blade Compressibility on the Performance of the UH-1F; FTC-TR-65-17

2. The performance data presented to TRASANA is the result of combining the helicopter power required, engine power available and engine fuel flow characteristics. The OH-58C power required was calculated from a non-dimensional representation of engine power required (coefficient of power) v.s. gross weight (coefficient of thrust) and true airspeed (advance ratio). The non-dimensional hover power required was obtained from reference 1b while that for forward flight was obtained from reference 1a. The forward flight power required was corrected to account for the +5.0 ft^2 equivalent flat plate drag area difference between the OH-58C and the OH-58A. All performance in ground effect represents a 2 foot skid height. A temperature dependent correction, based on the method outlined in reference 1e., was made to the power required to account for compressibility which could not be accounted for in the non-dimensional representation.

3. The T63-A-720 engine power available to the OH-58C (which was used in combination with the power required to find helicopter take-off and speed limits) was used as a function of altitude and temperature, from reference 1d.

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4. The engine fuel flow at a particular altitude and temperature combination was derived from a representative referred fuel flow as a function of referred engine power. The referred fuel flow curve for the T63-A-720 engine was taken from reference 1c. The calculated fuel flows reflect 5% conservatism. A referred parameter is one which is divided by temperature and pressure ratios in order to represent all atmospheric conditions by one function.

5. The never exceed speeds (V_n.e) were calculated from those shown graphically in reference 1d.

6. The Structural Gross Weight limit of the OH-58C is 3200 lbs.

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